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Support Material

GCE Computing

OCR Advanced Subsidiary GCE in Computing: H447

Unit: F454

This Support Material booklet is designed to accompany the OCR Advanced Subsidiary GCE specification in Computing for teaching from September 2008.

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Introduction

Background

A new structure of assessment for A Level has been introduced, for first teaching from September 2008. Some of the changes include:

- The introduction of stretch and challenge (including the new A* grade at A2) – to ensure that every young person has the opportunity to reach their full potential
- The reduction or removal of coursework components for many qualifications – to lessen the volume of marking for teachers
- A reduction in the number of units for many qualifications – to lessen the amount of assessment for learners
- Amendments to the content of specifications – to ensure that content is up-to-date and relevant.

OCR has produced an overview document, which summarises the changes to Computing. This can be found at **www.ocr.org.uk,** along with the new specification.

In order to help you plan effectively for the implementation of the new specification we have produced this Scheme of Work and Sample Lesson Plans for Computing. These Support Materials are designed for guidance only and play a secondary role to the Specification.

Our Ethos

All our Support Materials were produced 'by teachers for teachers' in order to capture real life current teaching practices and they are based around OCR's revised specifications. The aim is for the support materials to inspire teachers and facilitate different ideas and teaching practices.

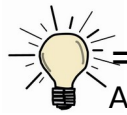
Each Scheme of Work and set of sample Lesson Plans is provided in:

- PDF format – for immediate use
- Word format – so that you can use it as a foundation to build upon and amend the content to suit your teaching style and students' needs.

The Scheme of Work and sample Lesson plans provide examples of how to teach this unit and the teaching hours are suggestions only. Some or all of it may be applicable to your teaching.

The Specification is the document on which assessment is based and specifies what content and skills need to be covered in delivering the course. At all times, therefore, this Support Material booklet should be read in conjunction with the Specification. If clarification on a particular point is sought then that clarification should be found in the Specification itself.

A Guided Tour through the Scheme of Work



= Innovative Teaching Idea

All the teaching idea contained in the SOW are innovative, but the icon is used to Highlight exceptionally innovative ideas.

= Stretch & Challenge Activity

This icon is added at the end of text when there is an explicit opportunity to offer
Stretch and Challenge.

= ICT Opportunity

This icon is used to illustrate when an activity could be taught using ICT facilities.

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Section title: 3.4.1 Definition, investigation and analysis

Suggested teaching time range	8 hours	**Specification content**	Teacher guidance	
Section summary		**Candidates should be able to:**	**Clarification and suggestions**	**Teacher notes**
• Define a task • Research the task and needs of the end-user(s) • Record findings • Analyse findings • Project plan including specification of the requirements: – user – hardware – software		a. define the nature of the task to be carried out;	A candidate should not expect the examiner to be familiar with the theory and practice in the area of the chosen system.	
		b. identify methods by which to investigate the problem, including questionnaires, observation and structured interviews; c. record information/data and gather sample documents currently used; d. identify the current processes and current data;	The candidate must plan the investigation carefully with initial questions and subsidiary questions. It is unlikely that the detailed requirements will be gathered through a single session and the candidate should plan to refine the detail gathered at each stage in order to focus more accurately on what is required by the end user in the final solution. Existing documents, systems, data or methods should be collected / observed and recorded.	
		e. analyse the data and processes: candidates will be expected to use appropriate techniques such as structure diagrams/data flow diagrams/system flowcharts to illustrate their analysis;	The information and data collected in the investigation stages must be analysed carefully and presented to the end user to illustrate the findings and indicate the way forward.	
		f. specify any perceived problems and inefficiencies apparent from discussions with the user and the analysis work carried out;	The candidate must plan the investigation carefully and analyse their findings. These findings should be reported back to the end user for consideration. There should be a cyclic approach to this section focussing more accurately at each stage on what is to be achieved.	
		g. derive the user and information requirements of a system;		
		h. specify and justify the required hardware; i. specify and justify the required software	The final specification for the system should be presented to the end user as the basis for a contract between them and the candidate.	

= Innovative teaching idea

= Stretch and challenge opportunity idea

= ICT opportunity

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Section title: 3.4.2 Design

Suggested teaching time range	10 hours	**Specification content**	Teacher guidance

Section summary	**Candidates should be able to:**	**Clarification and suggestions**	**Teacher notes**
Detailed system design including: • data structures • input-output format • processes involved A clear test strategy including test data needs to be developed to en the system mee the design objectives.	a. specify the objectives of the proposed system and relate them to the requirements specification;	The objectives follow from the requirements specification and it should be possible to demonstrate through testing that these have been achieved	
	b. design and document data capture forms and/or screen layouts, drawing up detailed mock-ups of the proposed interface; c. design and document report layouts, screen displays and/or other forms of output (for example, audio output), drawing up detailed mock-ups of the proposed interface;	Outline designs for the user interface are important. These can be prototyped using suitable software or hand drawn as appropriate.	
	d. identify, develop and document a test strategy for the design; e. select suitable test data for the design;	The objectives must be tested to demonstrate that they have been achieved. As a system is developed the various stages in its development are tested to ensure they work before moving on. A test strategy is vital to ensure this process anticipates how this ongoing testing will proceed.	
A clear design specification: • Specify the objectives relating them to the requirements specification	f. design and document using appropriate techniques (for example, data flow diagrams) the data structures necessary to solve the inefficiencies/problems indicated in the requirements specification; g. design and document an algorithm/pseudo-code/top-down diagram or other form of process model;	• For future maintenance and to demonstrate the processes it is vital that the process is adequately documented. • Good code design requires careful planning and the candidate must use the available techniques to demonstrate this planning and development of their system	
• Input design	h. using appropriate techniques test that the	This section refers to testing the algorithms, not the code	

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Section title: 3.4.2 Design

Suggested teaching time range	10 hours	**Specification content**	Teacher guidance

Section summary	**Candidates should be able to:**	**Clarification and suggestions**	**Teacher notes**
• Output design • Design and test plan and test data • Data structures/variable • Algorithms • Test algorithms	algorithms meet the design objectives.	and candidates should demonstrate that their algorithms achieve the desired results using suitable techniques.	

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Section title: 3.4.3 Software development and testing

Suggested teaching time range	18 hours	**Specification content**	**Teacher guidance**	
Section summary		**Candidates should be able to:**	**Clarification and suggestions**	**Teacher notes**
Develop a software solution and, using the test plan developed in Topic 2: *Design*, show that the system works with valid, invalid and borderline data (or, if it does not, under which circumstances it fails) Test plan clearly cross-referenced evidence that the system has been tested during development a implementatio Evidence of use testing • Software development		a. develop the rules/methods/algorithms of a design using a programming language; b. develop the data structures of the design using the appropriate features of a programming language; c. develop inputs/outputs using the features of a programming language; d. produce suitable modular code with full annotation and a description of how the modules combine to create the solution;	• This is the development stage of the process. • The project requires that the solution be substantially coded in a suitable high level language. The techniques expected are those introduced in previous modules. • The code developed should be based upon the earlier design stages and the candidate should demonstrate clearly how the coding relates to the design. • Annotation is essential for future maintenance of the system. As a guide line full annotation implies that were the code removed and only the annotation left, then the programme could be re coded and achieve the same result. Candidates should also use meaningful variable names.	
		e. test and refine the software solution during development, illustrating how the software solution evolves; f. test the software solution with the user, providing documented evidence that the solution works; g. produce detailed output from the testing, cross referencing as appropriate with the test plan.	• The system must be tested during development to show the intermediate stages working. • The final system must be tested by the developer for function and to ensure it meets the design objectives. • There should also be evidence of end user testing. • All of the testing must be carefully planned to demonstrate how the system meets the design objectives and all output from testing must be cross referenced against this plan.	

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Section title: 3.4.3 Software development and testing

Suggested teaching time range	18 hours	**Specification content**	**Teacher guidance**

Section summary	**Candidates should be able to:**	**Clarification and suggestions**	**Teacher notes**
• Alpha testing			

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Section title: 3.4.3 Software development and testing

Suggested teaching time range	18 hours	**Specification content**	Teacher guidance

Section summary	**Candidates should be able to:**	**Clarification and suggestions**	**Teacher notes**
• Response to the results of testingBeta testing • Response to the results of beta testing			

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Section title: 3.4.3 Software development and testing

Suggested teaching time range	18 hours	**Specification content**	Teacher guidance

Section summary	**Candidates should be able to:**	**Clarification and suggestions**	**Teacher notes**
• Modularisation of code • Code documentation • Use of modules, data structures and objects • In-code documentation • Code structure • Applying the test plan and data			

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Section title: 3.4.4 Documentation

Suggested teaching time range	6 hours	**Specification content**	Teacher guidance

Section summary	**Candidates should be able to:**	**Clarification and suggestions**	**Teacher notes**
• The software solution should be self documenting with suitable on-screen help and support for the end user(s) • All necessary supporting documentation required to enable the end user to make effective use of the solution.	a. develop detailed and appropriate user documentation.	• The system should be self documenting with suitable on screen instructions and help • There will be some necessary paper based documentation to ensure the system can be implemented successfully and this should be included	

Lesson Plan: GCE Computing
H047/H447
Unit F454
Section title: 3.4.1e Analyse Findings

Introduction

OCR recognises that the teaching of this qualification will vary greatly from school to school and from teacher to teacher. With that in mind, this lesson plan is offered as a possible approach but will be subject to modifications by the individual teacher.

Lesson length is assumed to be **one hour.**

Learning objectives for the lesson

Objective 1	Students will understand the need to analyse the results of an interview and the need for planned further investigation
Objective 2	Students will identify what further data they will need to collect in the investigation stage
Objective 3	Students will appreciate the various investigation strategies they can employ

Recap of previous experience and prior knowledge

The students have formulated an initial set of questions and possibly completed their first interview with their end user.

Content

Time	Content
5 minutes	Recap on the scenario introduced and the information gathered during the questioning process.
10 minutes	Whole class discussion about what extra information needs to be collected from the end user and how this might be obtained • Further questions • Questionnaires • Observation • Collecting documents • others

Time	Content
10 minutes	In suitable groupings the students need to identify what they have already discovered and what else they need to find out. They should formulate extra questions to ask in the role play.
10 minutes	Students ask their questions in a role play situation with the teacher in order to identify more detailed requirements for this project.
15-20	The students should analyse their findings and formulate an outline specification for the task discussed with the teacher.

Consolidation

Time	Content
10 minutes	Discuss the analysis and consider how this applies to their identified projects and what other techniques might bee appropriate to each of the students.

Homework

Topic	Teacher notes
Planning for the interview	If students have completed their initial interview with the end user they need to analyse the findings and develop a plan for further investigation of the problem.

Lesson Plan: GCE Computing H047/H447 Unit F454 Section title: 3.4.2a Specify system objectives

Introduction

OCR recognises that the teaching of this qualification will vary greatly from school to school and from teacher to teacher. With that in mind, this lesson plan is offered as a possible approach but will be subject to modifications by the individual teacher.

Lesson length is assumed to be **one hour.**

Learning objectives for the lesson

Objective 1	Students will understand how to specify measurable objectives based on a requirements specification
Objective 2	Students will be able to produce a set of objectives for a problem
Objective 3	Students will be able to use suitable diagrams to specify a solution

Recap of previous experience and prior knowledge

The previous sessions have used role play to investigate a sample scenario and students, through Q&A sessions have identified the end user requirements for this project. Students should also have made significant progress with investigating their own projects

Content

Time	Content
10 minutes	Recap on the requirements specification developed during the role play sessions.
10 - 15minutes	Whole class discussion about how the requirements specification can be re worked into a testable set of objectives. Discussion about how diagrams can be used effectively to represent the structure of the proposed solution.
15 -	In suitable groups the students should formulate a suitable set of

Time	Content
20minutes	testable objectives for the sample task and suitable diagrams can be utilised to clarify the structure of the proposed solution.
10 minutes	Students present their results to the class for discussion.

Consolidation

Time	Content
10 minutes	Recap the key elements from the session and discuss briefly how these might apply to the individual projects.

Homework

Topic	Teacher notes
	Students should start to develop suitable objectives and initial diagrammatic representations of the proposed solutions to their own projects.

The teacher should consider what they would require from the chosen project in advance in order to play the role of the end user in this activity.

Other forms of Support

In order to help you implement the new Computing specification effectively, OCR offers a comprehensive package of support. This includes:

OCR Training

Get Ready…introducing the new specifications

A series of FREE half-day training events are being run during Autumn 2007, to give you an overview of the new specifications.

Get Started…towards successful delivery of the new specifications

These full-day events will run from Spring 2008 and will look at the new specifications in more depth, with emphasis on first delivery.

Visit www.ocr.org.uk for more details.

Mill Wharf Training

Additional events are also available through our partner, Mill Wharf Training. It offers a range of courses on innovative teaching practice and whole-school issues - www.mill-wharf-training.co.uk.

e-Communities

Over 70 e-Communities offer you a fast, dynamic communication channel to make contact with other subject specialists. Our online mailing list covers a wide range of subjects and enables you to share knowledge and views via email.

Visit https://community.ocr.org.uk, choose your community and join the discussion!

Interchange

OCR Interchange has been developed to help you to carry out day to day administration functions online, quickly and easily. The site allows you to register and enter candidates online. In addition, you can gain immediate a free access to candidate information at you convenience. Sign up at https://interchange.ocr.org.uk

Published Resources

OCR offers centres a wealth of quality published support with a fantastic choice of 'Official Publisher Partner' and 'Approved Publication' resources, all endorsed by OCR for use with OCR specifications.

Publisher partners

OCR works in close collaboration with three Publisher Partners; Hodder, Heinemann and Oxford University Press (OUP) to ensure centres have access to:

- Better published support, available when you need it, tailored to OCR specifications
- Quality resources produced in consultation with OCR subject teams, which are linked to OCR's teacher support materials
- More resources for specifications with lower candidate entries
- Materials that are subject to a thorough quality assurance process to achieve endorsement

Hodder Education is the publisher partner for OCR GCE Computing

Hodder Education is producing the following resources for OCR GCE Computing for first teaching in September 2008, which will be available in Spring 2008._

OCR Computing for A level by Chris Leadbetter, Agneau, George Rouse

OCR Computing for A level Dynamic Learning Network Edition CD ROM by Chris Leadbetter, Agneau, George Rouse

Approved publications

OCR still endorses other publisher materials, which undergo a thorough quality assurance process to achieve endorsement. By offering a choice of endorsed materials, centres can be assured of quality support for all OCR qualifications.

Endorsement

OCR endorses a range of publisher materials to provide quality support for centres delivering its qualifications. You can be confident that materials branded with OCR's "Official Publishing Partner" or "Approved publication" logos have undergone a thorough quality assurance process to achieve endorsement. All responsibility for the content of the publisher's materials rests with the publisher.

These endorsements do not mean that the materials are the only suitable resources available or necessary to achieve an OCR qualification. Any resource lists which are produced by OCR shall include a range of appropriate texts.